17 ~~30.~~ (Once Amended) A method as defined in claim 13 ~~27~~, further comprising the steps of directing residual first molecular substance released from the chamber into a second chamber, and altering the vibrational distribution of the first molecular substance within the second chamber by directing the output of at least one [optical parametric oscillator] optical parametric oscillator/ laser ~~OPOL~~ tuned to at least one wavelength corresponding to at least one absorption band of the first molecular substance and promoting molecular vibration approximately at the at least one wavelength to form a peak within the vibrational distribution at the [at least one] wavelength and dissociate the first molecular substance.

Remarks

The Examiner has rejected claims 14-25 and 27-34 in her Office Action mailed May 27, 1993. The Applicant expresses gratification of Examiner Delacroix-Muirheid for granting the interview on September 27, 1993. The Applicant has amended the claimed limitations of all of the claims by this amendment. Reconsideration and reexamination of the application, as amended, is requested.

The Examiner has rejected claims 14-25 and 27-34 under 35 USC 103 over Morrey in view of Pratt, Jr. The Applicant comments that Morrey does illustrate a laser 21 which provides photonic radiation to a parametric oscillator 23. The combined laser and parametric oscillator is used to provide parametric radiation which is utilized in chemical reactions. The amended version of the claim now requires an OPOL be used in the photochemical process. The OPOL is configured as in U.S. Patent 5,195,104, issued March 16, 1993 to Geiger et al. (incorporated by reference on page 9 of the original specification). A copy of this patent is included with the present amendment.

The advantage of an OPOL over a discrete laser and OPO unit (such as is illustrated by Morrey) is that separating the OPO member and the laser requires a larger number of elements to accomplish the same task. The OPOL requires only one separated pump unit to achieve lasing, whereas the laser of the Morrey system requires a pump unit to achieve lasing action. Being able to eliminate the distinct laser unit also reduces the cost, complexity and the weight of the overall unit. Considering the applications of many lasers, this reduction in weight, complexity and cost can often make the difference in whether a laser-OPO unit (compared to an OPO) is the most attractive device for certain applications.

One other major advantage of an OPOL compared to the discrete OPO-laser units is that when radiation is transferred from a discrete laser portion to a discrete OPO portion, some percentage of the energy of the radiation will be lost. This energy loss may even be significant enough to limit the generation of parametric radiation (at the idler and signal frequencies) from the OPO portion in situations where parametric radiation would be produced in OPOLs. By comparison, in OPOL devices, the laser cavity and the OPO cavity often share the same space. For this reason, the energy transfer between the laser portion and the OPO portion of the OPOL device is minimal. Therefore, the OPOL device may be used in certain frequency applications where the discrete laser-OPO devices may not.

The Examiner uses the Pratt, Jr. reference to illustrate the concept of tunability of laser devices. Applicant comments that the device 26 of Pratt, Jr. is typically a frequency shifter, selector, or modulator (see column 6, lines 58-61). A frequency shifter is a different device from an optical parametric oscillator. A frequency shifter (which is typically a crystal) requires only input radiation to provide output radiation at different frequencies. An OPO, by comparison, requires input pump radiation and input signal radiation (the input signal radiation is often produced by electrical noise which the OPO is experiencing). An enhanced signal radiation and a new idler radiation will be created by the OPO, in a well known manner. This paragraph

demonstrates how a frequency shifter and an OPO are from non-analogous arts, and therefore to combine the Morrey reference and the Pratt, Jr. reference would require impermissible hindsight on the part of the Examiner.

In conclusion, since the Morrey reference does not illustrate an OPOL; and since the frequency shifter of Pratt, Jr. represents non-analogous art from the present invention, Applicant submits that the present claims distinguish over the prior art of record. Reconsideration and reexamination of claims 14-25 and 27-34, as amended, is requested.

Respectfully submitted,

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Date: October 1, 1993

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GLENN FOSTER
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